which evidences are still to be found in the hot springs and recent metalliferous veins met with in various parts of the Pacific coast.

d. From the variable temperatures at which the vacuities in their fluid-cavities become filled, it may be inferred that they are the result of an intermittent action, and that the fissures were sometimes traversed by currents of hot water, whilst at others they gave off aqueous vapour or gaseous exhalations. This is precisely what is now taking place at Steamboat springs, where the formation of a vein is in progress, and from which currents of boiling water are often poured forth, whilst at other times the fissures give off currents of steam and heated gases only.

e. That gold may be deposited from the same solutions which give rise to the formation of the enclosing quartz, appears evident from the presence of that metal in pyrites enclosed in siliceous incrustations, as well as from the fact of large quantities of gold having been found in the interior of the stems of trees, which in deep diggings are often converted into pyrites.

f. The constant presence of iron pyrites in auriferous veins, and when so occurring its invariably containing a certain amount of gold, suggests the probability of this sulphide being in some way necessarily connected with the solvent by which the precious metal was held in solution. It has been shown that finely divided gold is soluble in the sesquichloride of iron and, more sparingly, in the sesquisulphate of that metal. It is also well known that iron pyrites sometimes results from the action of reducing agents on the sulphates of that metal. If therefore sulphate of iron, in a solution containing gold, should become transformed by the action of a reducing agent into pyrites, the gold, at the same time being reduced to the metallic state, would probably be found enclosed in the resulting crystals of that mineral.

g. The silica and other substances forming the cementing material of the ancient auriferous river-beds have probably been slowly deposited at a low temperature.

The connexion existing between the decomposition of granite by the agency of boiling springs, the existence of alkaline plains, and the formation o f lakes containing various salts of soda and potash, is too obvious to require comment.

II. "Third Supplementary Paper on the Calculation of the Numerical Value of Euler's Constant." By William Shanks. Communicated by the Rev. B. Price. Received February 29, 1868.

When $n=5000$, we have

$1+\frac{1}{2}+\frac{1}{3}+\ldots\frac{1}{5000}=$

9·09450 88529 84436 96726 12455 33393 43939 17829
87811 30384 14506 16283 86638 30530 78016 46808
46902 09226 85495 77084+

E=·57721 56649 01532 86060 65120 90082 40243 10421 59335
93995 35988 05773 14949 71379 78029 07030 (last term is
$+\frac{B_{11}}{22 \cdot 5000^{22}}$).

Comparing the values of E obtained from taking $n=500$, 1000, 2000 (given in former papers), and 5000 (given in this), and *assuming* that the *increase* in the several values of E obtainable from taking n higher numbers will be *nearly constant*, we may conjecture that the value of the 60th decimal last found in E will be increased 1 by taking $n=5000 \cdot 4$; the 59th place will be increased 1 by taking $n=5000 \cdot 4^{10}$; in like manner the 58th decimal will be increased 1 by taking $n=5000 \cdot 4^{100}$, and the 57th also 1 when $n=5000 \cdot 4^{1000}$.

It is certain, however, that when n is very large we may, numerically speaking, express E pretty nearly by $Sn-\log_\epsilon n$; and indeed when n becomes infinite, the formula

$$E=Sn-\log_\epsilon n-\frac{1}{2n}+\frac{B_1}{2 \cdot n^2}-\&c.$$

becomes $E=Sn-\log_\epsilon n$, as given by Professor Price in his 'Infinitesimal Calculus.'

In the value of E last found, then, we deem it probable that *at least* 56 *decimals will remain unchanged, whatever high values be given to* n.

March 19, 1868.

JOHN PETER GASSIOT, Esq., Vice-President, in the Chair.

Prof. Theodor Ludwig Wilhelm Bischoff of Munich, Rudolph Julius Emmanuel Clausius of Würzburg, Hugo von Mohl of Tübingen, and Samuel Heinrich Schwabe of Dessau, were proposed for election as Foreign Members; and notice was given from the Chair that these gentlemen would be ballotted for at the next meeting.

The following communications were read:—

I. "Transformation of the Aromatic Monamines into Acids richer in Carbon.—II. On Menaphthoxylic Acid, the Naphthaline-term corresponding to Benzoic Acid." By A. W. Hofmann, LL.D., F.R.S. Received March 4, 1868.

In a paper communicated to the Royal Society* about a year ago, I pointed out the existence of an acid holding to naphthaline the same relations which obtain between benzoic acid and the hydrocarbon benzole. I have since prepared this compound on a somewhat larger scale, and I beg now to submit to the Royal Society some of the results which I have obtained in its examination.

The material used in preparing the new acid is *naphthylamine*, the mon-

* Proceedings of the Royal Society, vol. xv. p. 335.